What is claimed is:

1. A control apparatus of an optical signal exchanger which includes a first mirror array and a second mirror array, each having a plurality of tilt mirrors arranged on a plane, each tilt mirror having a reflecting surface an angle of which is controllable, and which sequentially reflects an input optical signal by said first and second mirror arrays to output from a specific position, for detecting power of an optical signal output from said specific position, and feedback controlling the angle of at least one of the reflecting surfaces of the tilt mirrors, which have reflected the optical signal on said first and second mirror arrays, based on the detection result,

wherein said control apparatus comprises a resonance component removing section that removes a frequency component corresponding to a mechanical resonance action of each said tilt mirror, included in a control signal used for said feedback control, and said resonance component removing section is at least shared corresponding to a pair of driving electrodes arranged in a coaxial direction of said tilt mirror.

2. A control apparatus of an optical signal exchanger according to claim 1, comprising:

a first mirror drive section that supplies a voltage to either one of a pair of driving electrodes arranged in a first axial direction of each tilt mirror of said first mirror array, and also supplies a voltage to either one of a pair of driving electrodes arranged in a second direction different from said first axial direction, to adjust the angle of the reflecting surface of said tilt mirror;

a second mirror drive section that supplies a voltage to either one of a pair of driving electrodes arranged in a first axial direction for each tilt mirror of said second mirror array, and also supplies a voltage to either one of a pair of driving electrodes arranged in a second direction different from said first axial direction, to adjust the angle of the reflecting surface of said tilt mirror;

an optical power detection section that detects power of the optical signal output from said specific position; and

a comparison control section that generates a control signal for controlling a driving state of the tilt mirror being an object to be controlled, so that an angular displacement of the reflecting surface of said tilt mirror is corrected according to the optical power detected by said optical power detection section,

wherein said resonance component removing section includes:

a first resonance component removing section that removes said resonance frequency component included in the control signal sent from said comparison control section to said first mirror drive section, by using a band-elimination filter that is at least shared for each of the first axial direction and the second axial direction of said each tilt mirror; and

a second resonance component removing section that removes said resonance frequency component included in the control signal sent from said comparison control section to said second mirror drive section, by using a band-elimination filter that is at least shared for each of the first axial direction and the second axial direction of said each tilt mirror.

3. A control apparatus of an optical signal exchanger according to claim 2,

wherein said optical power detection section outputs an analog signal indicating the detected optical power to said comparison control section,

said comparison control section converts the analog signal from said optical power detection section into a digital signal, and then, according to said digital signal, outputs a digital control signal for controlling the driving state of the tilt mirror being the object to be controlled, to said first and second resonance component removing sections, so that the angular displacement of the reflecting surface of said tilt mirror is corrected, and

each of said first and second resonance component removing sections removes said resonance frequency component included in the control signal from said comparison control section by using a digital filter.

4. A control apparatus of an optical signal exchanger according to claim 3,

wherein said comparison control section allots an even digital value as a control signal corresponding to one of the driving electrodes arranged in the coaxial direction of said tilt mirror, and allots an odd digital value as a control signal corresponding to the other driving electrode, and

each of said first and second resonance component removing sections has a function of determining, according to the least significant bit of a digital value input to said digital filter, to which one of the pair of driving electrodes arranged in the coaxial direction said digital value corresponds.

5. A control apparatus of an optical signal exchanger according to claim 3,

wherein said comparison control section allots 0 to 2^{n-1} of n-bit digital values

as a control signal corresponding to one of the driving electrodes arranged in the coaxial direction of said tilt mirror, and allots 2^{n-1} to 2^n of the n-bit digital values as a control signal corresponding to the other driving electrode, and

each of said first and second resonance component removing sections has a function of determining, according to the most significant bit of the digital value input to said digital filter, to which one of the pair of driving electrodes arranged in the coaxial direction said digital value corresponds.

6. A control apparatus of an optical signal exchanger according to claim 3,

wherein said comparison control section allots 0 to 2^{n-1} of n-bit digital values as a control signal corresponding to one of the driving electrodes arranged in the coaxial direction of said tilt mirror, and allots 2^{n-1} to 2^n of the n-bit digital values as a control signal corresponding to the other driving electrode,

each of said first and second resonance component removing sections determines a difference between the digital value input to said digital filter and a central value 2^{n-1}, and outputs the digital value corresponding to a value of said difference, as a control signal, to each of said first and second mirror drive sections, and

each of said first and second mirror drive sections D/A converts the control signal from each of said first and second resonance component removing sections to divide the control signal into positive and negative analog values, and sets said positive analog value as a control value corresponding to one of said driving electrodes arranged in the coaxial direction, and said negative analog value as a control value corresponding to the other driving electrode.

7. A control apparatus of an optical signal exchanger according to claim 6,

wherein, instead of the digital filter, an analog filter is provided in each of said first and second resonance component removing sections, said analog filter removes the resonance frequency component included in the D/A converted control signal in each of said first and second mirror drive sections

8. A control apparatus of an optical signal exchanger according to claim 2,

wherein said first resonance component removing section removes said resonance frequency component included in the control signal sent from said comparison control section to said first mirror drive section, by using a band-elimination filter that is shared corresponding to all tilt mirrors on said first mirror array, and

said second resonance component removing section removes said resonance frequency component included in the control signal sent from said comparison control section to said second mirror drive section, by using a band-elimination filter that is shared corresponding to all tilt mirrors on said second mirror array.

9. A control apparatus of an optical signal exchanger according to claim 1,

wherein said resonance component removing section is shared corresponding to a pair of driving electrodes arranged in a first axial direction, for all tilt mirrors on said first and second mirror arrays, and also is shared corresponding to a pair of driving electrodes arranged in a second axial direction different from said first axial direction.

10. A control apparatus of an optical signal exchanger according to claim 1,

wherein said resonance component removing section comprises, for each of said shared configurations, a band-elimination filter having elimination bandwidth corresponding to a variation in the resonance frequency of said tilt mirror.

11. A control apparatus of an optical signal exchanger according to claim 10,

wherein said resonance component removing section comprises a circuit in which a plurality of band-elimination filters having the same characteristic are serially connected.

12. A control apparatus of an optical signal exchanger according to claim 1,

wherein said resonance component removing section removes the resonance frequency component included in said control signal, by using a band-elimination filter of Butterworth type.

13. A control apparatus of an optical signal exchanger according to claim 1,

wherein said resonance component removing section removes the resonance frequency component included in said control signal, by using a band-elimination filter of Chebyshev type.

14. A control apparatus of an optical signal exchanger according to claim 1,

wherein said resonance component removing section removes the resonance frequency component included in said control signal, by using a band-elimination filter

of elliptic function type.

15. A control apparatus of an optical signal exchanger according to claim 1, wherein said resonance component removing section removes the resonance frequency component included in said control signal, by using a low-pass filter having a cutoff frequency corresponding to the resonance frequency of said tilt mirror.

16. A control apparatus of an optical signal exchanger according to claim 2, wherein, when the object to be controlled is switched from one driving electrode to the other driving electrode, with respect to the pair of driving electrodes arranged in the coaxial direction of said tilt mirror, said comparison control section supplies a control signal for making the one of the driving electrodes a non-driven state to a corresponding mirror drive section via said resonance component removing section, and then supplies a control signal for making the other driving electrode a driven state to a corresponding mirror drive section via said resonance component removing section.

17. A control apparatus of an optical signal exchanger according to claim 1, wherein said resonance component removing section includes a plurality of band-elimination filters having different transfer functions from each other, for each of said shared configuration, and selects at least one of said plurality of band-elimination filters according to a drive voltage to be applied to the driving electrode of said tilt mirror, to thereby remove the resonance frequency component included in said control signal.

18. A control apparatus of an optical signal exchanger according to claim 17, wherein said resonance component removing section selects one of said plurality of band-elimination filters, according to the time of initial startup and the time of feedback control.

19. A control apparatus of an optical signal exchanger according to claim 1, wherein said resonance component removing section includes a band-elimination filter whose transfer function can be changed, for each of said shared configurations, and changes a transfer function of said band-elimination filter according to a drive voltage to be applied to the driving electrode of said tilt mirror, to thereby remove the resonance frequency component included in said control signal.

20. A control apparatus of an optical signal exchanger according to claim 19, wherein said resonance component removing section changes the transfer function of said band-elimination filter, according to the time of initial startup and the time of feedback control.

21. A control method of an optical signal exchanger which includes a first mirror array and a second mirror array, each having a plurality of tilt mirrors arranged on a plane, each tilt mirror having a reflecting surface an angle of which is controllable, and which sequentially reflects an input optical signal by said first and second mirror arrays to output from a specific position, for detecting power of an optical signal output from said specific position, and feedback controlling the angle of at least one of the reflecting surfaces of the tilt mirrors, which have reflected the optical signal on said first and second mirror arrays, based on the detection result,

wherein a frequency component corresponding to a mechanical resonance action of each said tilt mirror, included in a control signal used for said feedback control, is removed at least commonly corresponding to a pair of driving electrodes arranged in a coaxial direction of said tilt mirror.